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CONVERGENCE WEAKNESS

M. Steinfield, Opt. D., F. A. A. O.
Paducah, Kentucky

Weakness of convergence is probably the cause of the trouble in a great many of our cases which do not get relief by wearing glasses properly fitted, and closer attention to the function of convergence would turn many failures into successes. Optometrists, as a rule pay too little attention to convergence. Even those who are in the habit of making muscle tests, content themselves with testing for imbalance at infinity, the greater number not even making the duction tests.

If a careful investigation be made in all cases into the function of convergence, we will find a large number showing an insufficiency of this power. A large percentage of those who, with their refractive errors properly corrected, cannot do close work satisfactorily, will show a low power of convergence.

Now as professional men we must learn to study the condition of all functions of the eyes, to diagnose our cases properly and to treat accordingly, that we may secure for our patients the maximum of comfort and freedom from eye strain. And by so doing we will add to our prestige individually, and our standing as a profession.

The diagnosis of convergence weakness is not difficult if the proper tests be carefully made and conditions studied. Exophoria is not necessarily an indication of convergence weakness and whether the exophoria is anatomical or the result of lack of convergence inervation must be shown by a study of the condition of that function. An exophoria of ten prism diopters with adduction capable of overcoming the exophoria and twenty prism diopters in addition, could certainly not be attributed to lack of inervation of the internal recti muscles. In fact I doubt whether we ever have more than three prism diopters of exophoria due to weak convergence alone. True exophoria has a tendency to build up adduction due to the exercise which the internal recti receive in overcoming the exophoria. In true exophoria, muscle exercise is of little benefit and when any treatment is needed prisms must be given. On the other hand, when there is an insufficiency of convergence whether exophoria be present or not, muscle exercise is indicated. However real exophoria may be present with a convergence weakness in which case the convergence should be given attention first, then the exophoria, if any attention be needed.

As to the causes, eye strain due to uncorrected errors of refraction or overuse of the eyes in close work, is responsible for most of the convergence weakness we encounter in our practice. Nervous exhaustion, anemia, and general physical debility probably rank second as causes. Weakness of the internal recti muscles of congenital origin is given as a cause by several authorities but cases of this are rare. In my opinion real weakness of the internal recti muscles is seldom a cause of convergence weakness but it is rather the inervation of these muscles that is at fault.

To make a diagnosis, all tests for convergence insufficiency must be made with the proper correction before the eyes. The muscle balance at twenty feet must first be taken using a light and Maddox rod, or prism and light as taught in any text book. As a rule one or two prism diopters of exophoria will be present in convergence weakness. And whenever a small amount of exophoria is present convergence weakness should be suspected. More than three prism diopters of exophoria would probably be a true anatomical exophoria. However orthophoria or even esophoria may be present. This esophoria is apparent, not real. In the effort to maintain sufficient convergence for close work, a spasm of the internal recti muscles (and usually of the ciliary also) is induced which causes an apparent esophoria. This false esophoria should be

no bar to efforts to increase the convergence when the diagnosis is one of convergence insufficiency.

The muscle balance at thirteen inches is next taken using any part of the usual methods. Five prism diopters of exophoria at this point is physiological, and unless considerably more than that amount be found it would not indicate convergence weakness unless there were other reasons for the diagnosis. Presuming we have orthophotia at twenty feet and exophoria of thirteen prism diopters at thirteen inches, we would expect other tests to show convergence weakness. However an exophoria of eight prism diopters at twenty feet and the same thirteen at thirteen inches would cause us to expect to find a normal convergence. And finding it we know our exophoria to be anatomical, and if symptoms of eye strain be present after correction of refractive errors, prisms are indicated.

Adduction at twenty feet is taken in the usual way with a light and rotary prisms. In convergence weakness the lights will usually double very quickly when prism power is turned base out, as a rule the greater the weakness the sooner the lights double. Sometimes only one or two prism diopters will be overcome, seldom more than six or seven. Once in a while a case will be found with strong accomodation in which there will be apparently a strong adduction due to the assistance rendered convergence by accomodation.

While a low adduction is an almost certain indication of weak convergence, an apparently strong adduction does not eliminate the possibility of a convergence insufficiency, and the convergence reserve and near point of convergence must be resorted to for further proof.

The convergence reserve is found by using a single vertical line of type placed on the phorometer slide in the card holder at thirteen inches from the eyes. (Fig. 1)

With the proper correction before the eyes, the rotary prisms are placed at zero and rotated base out until the line doubles, or blurs until it is unreadable. When these letters become blurred, the limit of convergence has been reached and accomodation is assisting convergence. As soon as two lines are seen the point is noted and the prisms are reduced until the lines are brought together again. About twenty four prism diopters is a satisfactory convergence reserve. If convergence be good, the lines will be brought together when the prisms have been reduced about five diopters. Sometimes a patient with weak convergence will hold the line single for a considerable amount, but will be unable to again fuse them until the prisms have been reduced to almost nothing. It will be

KEEP
THIS
ROW
OF
LETTERS
SINGLE

(Fig. 2)

in these cases as a rule that the letters become blurred, indicating that accomodation has been exerted to assist. We should not attach as much importance to the amount, as to the quality of convergence shown.

The near point of convergence is, I believe, the most important of our convergence tests. The patient fixes a small object, (I use a small white headed pin) held on a line with the eyes and

directly in front. The pin is brought slowly toward the nose until it is seen double, or one eye turns outward. The point at which either occurs is the near point of convergence. The normal near point of convergence is conceded by most authorities to be three inches or less from the eyes. Farther than three inches need not necessarily cause trouble although with a near point farther than four inches we may expect it, especially if much close work is done. Turning out of one eye indicates a greater weakness than would a doubling at the same point. In uncorrected exophoria the near point will be farther from the eyes and this must be taken into consideration. The treatment, the first step in treatment of convergence insufficiency is the correction of the error of refraction to be worn constantly, and a complete rest of the eyes from all close work. This will in weakness of a moderate degree frequently suffice for complete relief. When at the expiration of several weeks the symptoms persist and no improvement is shown, muscle treatments should be given.

Exercising the adduction at twenty feet is the most satisfactory treatment I have found. Where adduction is very low a large object serves better for fixation than a light. A two hundred foot letter by itself is very good for the purpose. I have a test cabinet illuminated from the inside, and by painting over the astigmatic dial leaving a wheel three and a quarter inches in diameter in the center I have the most satisfactory object I have found.

As soon as the patient can overcome fifteen or sixteen diopters of prism base out without doubling, the twenty foot row of letters (or the smallest line he can read if his vision is not that good) is used and he is trained to keep the letters from becoming indistinct as prism base out is turned before his eyes. When accomodation is used to assist convergence the letters will become blurred. The patient must be taught to overcome prism without using accomodation. He is told to keep the letters clear enough to make them out as long as possible. Many who can hold lights from doubling for a long time, cannot at first keep the letters clear as much as two prism diopters. The average patient will learn to overcome from twelve to sixteen diopters holding the letters readable, which indicates a very satisfactory adduction.

The pin exercise using the white headed pin has been found of some assistance. The patient is instructed to hold the pin about a foot from the eyes, and bring it in slowly keeping it single as long as possible. This is done several times, twice a day. It is not advisable to give this exercise to one whose eyes turn out at any time in doing it.

A number of other methods of exercising convergence are given by different authorities. Gould's method of lose prisms which the patient uses himself, and Wells Sterescope exercises are about the best known. I have found few patients who will do exercising at home satisfactorily, and have found nothing that would succeed where the regular duction treatment failed.

A large number of failures in refraction are due to muscle conditions and proper attention to the latter will make successes out of failures. Convergence insufficiency is the most common of our muscle troubles. It is not difficult to diagnose and ordinarily responds readily to treatment.

SOCIETY PROCEEDINGS

THE MINNEAPOLIS ASSOCIATION OF OPTOMETRISTS

January 16th, 1924.

Dr. L. L. De Mars, Presiding.

Anisometropia.

DR. CAREL C. KOCH presented a case of Anisometropia, in a patient, male, age 24, occupation, Fireman. Case came to me on the ninth day of September, 1923, complaining of interocular pains and bringing with him a pair of glasses which had been prescribed for him about a month before by an optometrist of this city. These glasses had given him no comfort. He stating that he saw things double when he put them on. These glasses proved to be as follows: O. D. + 4.00 D. Cyl axis 120, O. S. + 1.00 D Sph. With this correction in place his monocular visual acuity was normal, but the images formed were not the same in size and my diagnosis was that the fusion sense was not able to fully assimilate the two different images, when the full correction was in place, and binocular vision attempted. After completely refracting the case I verified the above findings. I then explained his condition to him and prescribed a new right lens as follows: O. D. + 1.50 D. cyl axis. 120, the left lens to remain the same. This correction gave a visual acuity in the right eye of 20/100 and of course in the left eye of 20/20/+. He was instructed to return in thirty days.

This he did. I again retracted the case, the findings being the same as on the first visit. I then prescribed a + 2.25 D. cyl axis 120 for the right eye. This gave him a visual acuity of 20/50, the left eye as before to remain the same. He was again asked to return in 30 days.

He did, saying his eyes felt fine. I refracted the case again, this time prescribing a +3.00 D cyl axis 120 for the right eye. This gave him an acuity of vision of 20/40 plus, with the right eye and a binocular acuity of 20/20 with no discomfort. He was to again return in 30 days.

On January 5th he returned and after another refraction I prescribed the original right lens, a + 4.00 cyl axis 120. requesting that he return in 48 hours to report upon condition. He now had binocular vision each eye hava normal acuity of vision.

He returned on January 7th stating that he was having no trouble with the correction.

Now just what was the reason for the diplopia and ocular distress in the first place. Was it, as I have already stated, that the difference in the size of the images made binocular vision impossible or was it the effect of wearing a correction with such a dissimilarity of lens value?

Discussion. DR. J. I. KURTZ, It would seem to me that the fusion sence would have a harder time coordinating the images with the initial correction you prescribed than it would with the finished formula, as originally prescribed.

Dr. G. W. YOUNG. How did you decide upon the initial formula prescribed?

DR. CAREL C. KOCH. I used the strongest cylinder that would permit binocular vision.

DR. L. L. De MARS. The wearing of a correction of such disimilarity of lens value aside from the strong one neutralizing the oblique astigmia has no bearing on the case.

Without lenses the images produced upon the retina were quite dissimilar. The individual foci on the retina of the left eye, with accommodation functioning, were exact points. Those on the retina of the right eye were not points, but long slanting ovals, when the eyes were accommodating the equivalent of the hyperopia of the left eye.

Going back now to the visual centers in the brain we would find the two images registering; a bright, clear, distinct one with a more or less distorted one superimposed and more or less spoiling good distinct vision. This of course is intolerable to nature and forces are aroused to overcome the poor result.

Nature will try to do this in two ways, either by endeavoring to suppress the poor image or try to equalize the images by accommodating to about the limit of the hyperopic meridian in

the right eye. Now, then, if the two eyes accomodate equally, this act would produce two blurred superimposed images in the visual centers and give the patient comfortable if only a subnormal vision.

The data given does not indicate what the visual acuity was without lenses, nor his complaint. We can assume then that he was seeking glasses for improvement of vision, because of his occupation and that his eyes did not bother him except say at the movies and with reading.

Fortunately the sensibilities of his visual apparatus particularly the rods and cones and the visual centers were in no way subnormal as they frequently are under the similar conditions.

When the +1.00 sphere was placed in front of the left eye as the correction of its ametropia the change in the usual habit of the ciliaries was not great and it readily accepted the relief and the slight brightening of the image in the visual centers. The whole trouble lies in the other eye. The +4.00 cyl. x120 did three things, it changed the individual blurred foci to point foci making a clear image possible on both the retina and the visual center, the lens relieved the ciliary muscles of their excessive accommodation effort and at the same time relieved the co-incident strain on the extrinsic muscles that accompany oblique astigma.

The result of wearing the full correction continually for the first time was not exactly in the nature of a shock as you might imagine, but a great deal disturbance in the muscle tissue which had strained and hypertrophied by years of effort to produce acceptible visual acuteness.

Now you know if you over correct either hyperopia or myopia in some cases the patient will complain of the objects looking smaller, so in our case, when the full correction was imposed the strength of the lens and the only partially relaxed muscle tissue caused the same effect as slight or greater over correction making the image of that eye at the visual center smaller.

So far both images at the visual centers are good and clear, but of unequal size. The fusion sense is actively disturbed by this because of the blurred vision resulting. It therefore makes frantic efforts to either suppress or separate the images and causes the ocular distress experienced. The diplopia being easily induced by the disturbances in the extrinsic muscles.

The method of treatment of this case I believe was masterly. The first lens prescribed was nearly ½ as strong as the full correction needed and improved vision from 20/200 to 20/100—. Enough so that the habitual functionings were slightly relieved and improved with every little effort of adaptibility needed. Then this was worn sufficiently long to establish the changed conditions. The second lens prescribed of still stronger power improved the V. A. quite a bit more, that is, to 20/50 and a new period of relaxation and adaptation demanded. Then after that other periods and lens changes until at last the true correction could be worn with satisfaction and comfort.

DR. E. O. WORMAN, mentioned a somewhat similar case, he was just starting, the patient however having trouble with near point work. He wanted to know if a plus spherical lens could be added to such a partial treatment correction for near point work.

DR. L. L. DE MARS. I would use my Dynamic spherical addition, added to the partial treatment correction, made up in an extra pair of glasses for close work only.

Astigmatic—Exophoric Case

DR. J. I. KURTZ, presented a case of Exophoria and Astagmatic error. The patient, male, age 35, occupation, tailor. Came to me November 30th, 1923. Complained of frontal, temporal and interocular pains. Also an inability to see for near work. The pains were constant and developed as soon as the eyes were used at his work. The patient is very nervous. He does not sleep well at night. He is 5 feet, 9 inches in height and is 20 pounds under weight. He has venerial history.

The examination showed, the Fundus to be normal. With the Ophthalmometer the findings indicated 1½ D. of Corneal Astigmatism. The Skiametry Static findings were, O. D. −0.75Sph. () −1.25 D. Cyl. axis 180. O. S. −0.25 D. Sph. () −1.25 D. Cyl. axis 180. Dynamically these findings were changed to, O. D. + 0.50 D. Sph. () +1.50 D. Cyl. axis 90., O. S. +1.50 D. Cyl. axis 90. Subjectively the visual Acuity uncorrected was 20/25, O.

D., or O. S. Corrected, with a −1.00 D. Cyl. axis 180 the acuity of vision increased to normal, O. D., or O. S. The Tonicity test at 6 meters showed 12 degrees of Exophoria, combined with 2 degrees of Right Hyperphoria. After deducting for the physiologic, there remained 13 degrees of Exophoria at the near point. The Ductions were as follows, Adduction, 4 prism diopters, Abduction, 8 prism diopters. The reserve fusion convergence was 4 prism diopters. The correction he had been using was as follows, S. −0.25 D. Sph. () −0.75 D. Cyl. axis 90. This I changed to the following, O. D. −0.75 D. Cyl. axis 180., O. S. −0.25 D. Soph. () −0.75 D. Cyl. axis 180., at the same time ordering a complete physical examination. Subsequent report showed, urine, blood, wasserman, etc., negative. The patient was then given Oculo Prism treatments, daily for five weeks, with the following results. On December 8th, the patient had 10 degrees of Exophoria; on December 12th, 8 degrees; on December 16th, 6 degrees; on December 24th, 3 degrees; and on January 10th all the lateral imbalance had disappeared, both at a distance and at the near point. The reserve fusion convergence was now 20 prism diopters, with an adduction 30 prism diopters and an Abduction of 8 prism diopters as before. The patient now reports that he feels much better but he still has interocular pains from time to time. On January 12th I re-examined the case. The Static Skiametry findings showed no change. The Dynamic findings however showed quite a change, they now being, O. D. +0.75 D. Sph. () +1.25 D. Cyl. axis 90., O. S. +1.00 D. Sph. () +1.00 D. Cyl. axis 90. There was no muscular imbalance.

You will notice that the 12 degrees of Exophoria at both the near point and at a distance has now disappeared and that the Adduction has been raised from 4 to 30 prism diopters. Also that the reserve fusion convergence has increased from 4 to 20 prism diopters. Now I find on making a subjective examination that the patient has a normal acuity of vision with either plus or minus cylinders. Which shall I prescribe?

Discussion. DR. L. L. DE MARS, It would seem to me that plus lenses for distance were indicated. One can easily see the difference in the aspect of the case after the series of muscular treatments. Before these were given there were plenty of indications of a passive weakness. The patent's line of work driving his vision, perhaps not under the most favorable conditions, and in a sedentary position plus the fact of his under weight all point to this weakness.

The Exophoria co-incident upon the weak adduction is the nub of the whole case. Exophoria means a subnormal condition of the nerve paths to the interni muscles causing the visual lines, to diverge under the influence of the maddox rod when the fusion sense is checked.

Now, then, when the eyes force the visual lines to converge or fix for infinity the extra amount of nerve force which must come to the interni to perform the act causes the ciliaries to act involuntarily and produce a negative astigmia axes 180 out of what really is a positive astigmia axes 90. Thus we behold the eyes accepting with equal pleasure and relief either plus or minus lenses. The first because, with the nerve paths to the interni being enlarged greater energy can come more freely to the converging muscles, and offset the old tendency to diverge and the second because with the restored power the muscles can overcome the minus lenses. It stands to reason that if minus lenses were prescribed they would in time become a burden. I would therefore advise as I have already said, the use of plus cylinders.

DR. CAREL C. KOCH, My experience with these cases somewhat parallels that of Dr. De Mars and I would also advise plus cylinders, his Exophoria having now disappeared. The plus lenses will be more of an aid for the near point work.

Retinal Fatigue

DR. J. E. PETERSON, presented a case of Retinal Fatigue. Patient, farmer, age, 64. Patient had recently retired from active work and now complains of a Frontal headache and an inability to see at the near point, after a few moments of reading. When he came to me he was wearing a pair of bifocals. These proved to be as follows: O. U. +1.25 D. Sph, for distance, with a +2.50 D. Sph. added for reading

Upon examination I found the acuity of vision to 20/50 uncorrected. There were no signs of pathology present either externally or internally. The Ophthalmometer showed no corneal astibmatism, and my Static Skiametry findings were, O. U. +1.62 D. Sph. This was verified in the Subjective test giving him a normal faculty of vision, O. D. or O. S. The muscle tests showed orthophoria. My dynamic Skiametry findings indicated an addition of +2.75 D. Sph. I then prescribed the following formula for him for constant wear. Distance, O. U. +1.62 D. Shp. Reading, O. U. +4.37D. Sph. This was made up for him in a one piece bifocal, but with it in place he cannot read more than from one to five minutes before vision blurs, at the near point. Thinking it might be the bifocal element that caused the trouble I then prescribed for him, two pairs of glasses, one for reading and one for distance wear. These proved no better than his bifocals. He cannot read and is quite discouraged. His general health I might add is none too good.

Discussion. DR. CAREL C. KOCH Unfortunately, these cases are not rare. My belief is that they are generally due to one of two causes. First lack of nerve force, or second, some Toxic poisoning. I would suggest that you look into the matter of focal infections regarding this case and also inquire into the possibility of it being a mild form of Toxic Amblyopia.

DR. L. L. DE MARS, I would suggest you try a monocular reading correction for this patient. This would eliminate of course all convergence and this, sometimes, aids this sort of case.

Asthenopia

DR. B. F. WOODBURN, presented a case of Asthenopia. Patient, female, age 41. Patient complained of intraocular pains and a complete inability to do close work, although vision was normal at the near point. The only way she could get relief was by applying cold packs over the eyes. On refracting the case I found the eyes to be normal in appearance and had no difficulty checking up her correction. The Tonicity and Ductions were also normal and I finally prescribed, O. D. +2.50 D. Sph. () +0.75 D. Cyl. axis 75, O. S. +2.50 D. Sph. () +0.75 D. Cyl. axis 105. This she was to use in place of the +2.25 D. Sph. she had been using. This new correction seemed no better than the first and after using it a month she consulted another refractionist, a physician who changed the correction to O. D. +1.50 D. Sph. () +0.75 D. Cyl. axis 75, O. S. +1.75 +4.75 D. Sph.() +0.75 D. Cyl. axis 105, stating at the same time that her eyes seemed normal to him. This correction seemed a little better for a few days but now the old trouble has returned.

In view of her age, and her Dynamic findings, which were, O. D. +4.25 D. Sph. () +0.75 D. Cyl. axis 75, O. S. +4.75 D. Sph () +0.75 D. Cyl axis 105, I had originally suggested that she use bifocals or at least another correction somewhat stronger than the first to aid her in doing close work but she would have none of this. Today she is as uncomfortable as ever, and has returned to seek additional relief if possible.

Discussion. DR. L. ARDUSER, The patient needs bifocals or at least a set of reading glasses, and these should have been prescribed whether she wished it or not.

DR. J. LINNER. The Dynamic findings show clearly the need of a reading correction and her trouble is probably due to the strain on the Ciliary muscles in their effort to keep the images clear at the near point.

DR. CAREL C. KOCH, I agree regarding the possibility of a need for a reading correction, and might also add that oculo-prism treatments for all the extrinsic muscles of the eyes are frequently of assistance in this type of case, as they tone up the entire orbital cavity.

Nettie H. Rose, Opt. D.,
Secretary.

NOTES, CASES AND INSTRUMENTS

RETINOSCOPY

HARRY T. BANDLE, Opt. D.

Spring Valley, Minn.

A great deal has been written and said regarding retinoscopy, or the shadow test, in reference to estimating the errors of refraction of the eye. The subject is an interesting one and the general theory is fairly easy to master. However, in practice it is somewhat more difficult to acquire a perfect technic.

Retinoscopy is best done in a moderately dark room, preferably 20 feet in length although mirrors may be used in a twelve foot room or in fact any arrangement so as to give the patient a point of fixation at infinity. This matter of a point of fixation is an important one, insomuch as many patients, if merely instructed to look at infinity will let their eyes wander from point to point thus somewhat confusing the operator. Also if no point of fixation is given there is a strong tendency in some patients particularly children, to watch the optometrist rather than look at distant objects.

The working distance is a matter to be arranged to suit the operator. The writer uses a 26 inch working distance. Some refractionists prefer a 20 inch distance, while others use a 40. Any of these will do as long as the distance used is known and accurate. It is best to decide on a known distance and then do all your static retinoscopy at this distance, as the constant use of the same distance will tend to make you more and more proficient, in this the most important phase of the objective refraction.

The instruments you can use consist chiefly of the two forms of the plain mirrored retinoscope, the luminous or the non-luminous instrument. When using the non-luminous retinoscope, a hooded light on a bracket must be provided. This light must be placed, slightly above and to one side at the rear of the patient. With the luminous type of instrument of course no extra light is needed.

Retinoscopy consists briefly in neutralizing the movement of a pencil of light as it crosses and re-crosses the retina as seen through the pupilary aperture. This is done by means of lenses. The technic most in vogue is to neutralize all the "with" movement first, with plus spheres and then correct any remaining movement with minus cylinders. The goal is the "point of reversal." When this has been reached all shadow movement will have disappeared. Neutralizing all the "with" movement first is a very satisfactory form of procedure because it enables the optometrist to give the maximum correction to Hyperopic cases. Should the original movement be "against," correct it with minus spheres, and of course cylinders if needed.

It is not advisable to write a prescription directly from the findings of our skiametry test, however when these tests are correctly made the subjective tests become more or less check tests, made merely to verify our retinoscopic findings.

There are numerous instruments on the market at the present time, all of them having their proper place, and all are essential to the optometrist. With their aid the various phases of refractive error can be uncovered and the corrections proven, but in my estimation the solution can generally be found with the retinoscope, in less time and with greater ease than by using any other method.

To those who have not mastered its technic, I would say, use this instrument on every case until you become thoroughly familiar with its wonderful diagnostic value.

ANATOMICAL EXOPHORIA

WALTER B. LYON, Opt. D.

Albert Lea, Minn.

Patient, Male. Age, 30. Been complaining for the past three years of an inability to see objects clearly in lamplight without double vision after approximately 30 minutes reading. A tired strained pull, after a morning at near work, a dull frontal and temporal pain which feels as though a band was being tightened around the forehead.

He has had eyes examined by many refractionists. Worn glasses approximately 14 years.

On February 17th, 1922, the case was refracted. At this time the visual acuity without glasses was O. U. 20/20??? Monocularly this was O. D. 20/30??, O. S. 20/20???. The ophthalmometer showed ¾ of one diopter of corneal astigmatism in the right eye and 1½ diopters in the left. The refractive error was corrected as follows: O. D. −0.25D Sph. ( ) + 0.50 D. Cyl. axis 80., O. S. − 0.50 D. Sph. ( ) + 1.00 D. Cyl. axis 100. The ductions were: Adduction 26 P. D., Abduction 20 P. D., Infraduction 2 P. D., Superduction 2 P. D. The tonicity test at 6 meters showed 6 degrees of Exophoria. At 33 c/m, 22 degrees of Exophoria. The Convergence power at the near point was normal. The case was corrected with the above prescription. These glasses were worn with comfort, except when tired or over-doing close work, for approximately six months, when the strain of overcoming the Exophoric condition was too great. An extra pair of eye glasses was then made up having a 2 D. prism base in for use when doing all near work. This seemed to work fairly well for some time; until on examination in July 1923 the correction was changed to the following.

O. D. + 0.37 D. Cyl. axis 80 ( ) ½ degree Prism Base In. O. S. − 0.50 D. Sph. ( ) + 1.00 D. Cyl. axis 100 ( ) ½ degree Prism Base In. This prescription was later verified by Dr. McCray, a professor at the Northern Illinois College of Optometry, at the writer's request, when the patient was in Chicago. A separate set of glasses was again prescribed for reading. This correction again had a 2 D. prism base in for use at the near point.

While attending the Twenty-third Annual Convention of the Minnesota Convention of the Minnesota State Association of Optometrists, I discussed this case with Dr. Charles Sheard. His opinion was that a 2 degree prism should be prescribed for distance wear and at least a 4 degree prism prescribed base in, for near point work. This was tried but proved a bit too strong. He also said that Oculo-Prism treatment would amount to little ultimate good. This too, I have found to be the case. The treatments do no permanent good. I found I had to be giving them continually, because the increased power of convergence gained by the treatments would wear off very rapidly when they were stopped.

Prisms seem to be the only agent that will give any relief, and even now the patient has little comfort doing much close work.

CORNEAL ASTIGMIA

CAREL C. KOCH, Opt. D., F. A. A. O.
Minneapolis, Minn.

Patient L. D., Female. Age 72. Occupation, Housewife. General physical condition good. Patient came to me on January 2nd, 1924. She had been wearing a reading correction for years and now decided that it was time to get distance glasses. Upon taking her visual acuity, binocularly, I was surprised to find it somewhat less than 20/300. The reason became apparent as soon as the ophthalmometer was used. The dioptric power of the various meridians of the cornea were as follows: Right eye. In the 60th meridian the cornea had curvature amounting to 42 diopters, while in the 150th meridian the curvature amounted to 48.50 diopters. This gave a resultant corneal astigmia of 6.50 diopters. The left eye was even worse, in the 100th meridian the curavture was 41.75 diopters, while in the 10th meridian the curvature was 50.50 diopters, giving this eye a corneal astigmatic error of 8. 75 diopters.

The case was satisfactorily corrected with Sphero-cylinders. The cylindric element being about 2/3 of the full corneal malcurvature.

ABSTRACT DEPARTMENT

Hutshing, E. E. Ocular Infections. Optical Age. Vol. 20. No. 9. pp. 17-21. 1924.

Hutshing describes two forms of epidemic ocular infections which should be familiar to all optometrists. The first, a diplobacillary (bacteria consisting of two adherent cells) conjunctivitis, due to the Morax-Axenfeld bacillus, and second, the more acute conjunctivitis, known as "pink eye" due to the Koch-Weeks bacillus.

The more unusual objective symptom of infection of the conjunctiva by this diplobacillus is the production of an acute catarrh which results in a chronic condition which may last for months. The early symptoms of this disease are usually an itching and burning of the lids, and sometimes patients complain of asthenopia. Other symptoms that are complained of are, headaches, blepharitis and the formation of a profuse sticky yellowish secretion at the inner canthus. Occasionally the signs of inflamation are very slight and thus easily overlooked, and as the patient may complain principally of a burning sensation in the eyes, especially when reading by artificial light, he may be treated for asthenopia by means of glasses, though of course without the looked for results. A patient presenting himself with the slightest chronic secretion at the angles of the eyes should be at once referred to an opthalmologist under whose guidance the proper treatment should be given.

We have referred to a second bacillus, namely the Koch-Weeks, as another cause of an acute conjunctivities. The objective symptoms of this form of infection are as follows: First the bulbar conjunctiva is very inflamed. Second, a thick purulent discharge appears, usually in both eyes. Third, the lids are very red and slightly swollen and in some patients stick together in the morning on awakening. The subjective symptoms are a circumorbital pain and headache and generally a slight cold in the head is complained of. These cases should also be sent to the physician for treatment.

Hutshing also describes the paralysis of the accommodation due to the toxic infection of pharyngeal diptheria, and goes into great detail describing both the diptheria and tubercle bacillus.

H. B. K.

Goldnamer, W. W. Meter Measure for Retinoscopy. American Journal of Opthalmology. Series 3. Vol. 6. No. 8. p. 685. 1923.

To facilitate accuracy in the matter of Retinoscopy, Dr. W. W. Goldnamer, M. D., of Chicago, devised what is now called the Goldnamer Meter Rule. This rule consists of a tape, one meter in length, marked off in centimeters. At each end is attached a small convenient chin rest. The object of the meter rule is obvious. The observer and patient each hold a chin rest in place keeping the tape taut, thus the working distance is ever fixed and accurate.

C. C. K.

Cox, C. E. A New Method of Making School Surveys.. Rochester School of Optometry.—Focus. Vol. 4. No. 3. pp. 25 and 34.

Cox suggests the formation of an optometric team to conduct visual surveys in the larger centers, for the school children. The team is composed of seven optometrists, and school children can be handled comfortably at the rate of fifty an hour, which is as fast as the usual visual survey can be done properly.

The child is given a square of fiber board on which is clamped the survey record blank in duplicate. This he carries through the survey and the findings by each man are noted thereon. The school nurse distributes these and takes care of bringing the children from class as they are needed. Any class room or even a corridor can be used for the work.

The men are arranged around the room in the sequence of their operation so that the child may pass from one to the other without confusion. Visual acuity is taken first, both to prevent the child from memorizing the letters while waiting and to eliminate any slight fatigue which the survey may cause. This is the only phase which is subjective.

The next man examines the versions and the P. P. of convergence and is followed by the third who notes the re-

action of the visual axis under the seclusion test and the P. P. of accommodation. This gives an objective survey of the muscular status of the eyes.

The skiametric work is taken care of by two men working dynamically and the error classified as hyperopia less or more than one diopter or Myopia less or more than a half diopter. Hyperopia of more than one or Myopia of more than a half diopter. The survey is completed by an ophthalmoscopic examination of media and fundi.

The final step is to sum up the case, taking into consideration the findings of all preceding steps, together with any subjective symptoms which may be present and make the recommendation which they warrant.

The result of such a survey is advice based not only upon results or damage already done, but upon the causes, which makes it primarily a protective measure and a potential means for the consideration of vision.

C. C. K.

Fox, L. W. Heterophoria and Astigmatism Charts. American Journal of Ophthalmology. Series 3, Vol. 6, No. 8, pp. 684-685, 1923.

A novel form of a combination phoria testing device and astigmatic test chart has been constructed under the supervision of Dr. L. W. Fox, M. D., of Philadelphia. In an article under the above heading Dr. Fox describes the instrument as follows: "A Prentice Phoria indicator is placed flush with the front surface of a lid on a black cabinet. The cabinet is vertically positioned on a telescoping rod with base. This telescoping feature permits the operator to raise and lower the instrument to a point exactly on a level with the patient's eyes. The discs of light on the phoria indicator are arranged like a Greek Cross with the central light red, and from it radiating vertically and horizontally, one degree prism angle apart, are green lights, five-eighths of an inch in diameter. These discs of light are controlled by a switch at the examiner's table. On the reverse side of the cabinet is placed an astigmatic chart, very much like the usual clock-dial chart. This chart is readily brought into position by simply rotating the cabinet on its base."

C. C. K.

BOOK NOTICES

MEDICAL OPHTHALMOLOGY. By Arnold Knapp, M. D., Professor of Ophthalmology, Columbia University. Executive Surgeon, Herman Knapp Memorial Hospital. Page 509, 32 Ill. Phila.: P. Blakiston's Son & Co. 1918.

This volume is one of the set of the System of Ophthalmic Practice, by Walter L. Pyle, A. M., M. D., and gives the relationship of ophthalmology to medicine and the other sciences, The work is divided into: Diseases of the Nervous System; Diseases of Glands with Internal Secretion; Poisons; Diseases of the Circulation, Respiratory Tract, Digestive Tract, Kidneys, Diabetes and Hereditary Eye Diseases, and relates the eye changes thus brought about. Being primarily an aid to the medical practioner it is nevertheless an essential adjunct to the optometrist's diagnostic armamentorium and should find its way into the library of all optometrists. In this book we find the eye changes brought about by the various common diseases and affections and it is a clinical reference of note.

E. O. F.

THE NORTHWEST JOURNAL OF OPTOMETRY

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CO-OPERATIVE EDUCATION

We have been very much concerned during the last decade about optometric publicity and education of the public toward caring for it's eyes, and rightly so. Those who have had the interest of Optometry at heart have done a big and noble work. The free clinics and gratuitous work of the optometrist as school examiner have been a charitable and humane effort to better the physical welfare of our school children who are being equipped mentally to cope with the problems of tomorrow. Our oft-repeated warnings to care for the eyes in time have no doubt served many an individual from near or possibly total blindness and thus made him a more efficient and useful member of society. If in the performance of this service, the Optometrist has profited financially, the service is no less worthy.

But of late we have been hearing much about "co-operative education." This is no new thought but has been emphasized and given additional impetus by First Vice President, Dr. George S. Houghton, of the A. O. A., the efforts of the American Academy of Optometry and by the raising of the A. O. A. Educational Fund. We have as intimated before, done much toward educating the public to a realization of eye-care. Have we done as much as we could have toward improving ourselves so we might render better and more efficient service to the individuals who apply for our aid? Are we still giving our patients a ten or fifteen minute trial case examination or are we giving each case a full three quarter's or an hour of careful attention to discover the individual aspects of the particular case in order that we might diagnose, prescribe and prognosticate efficiently. Some of us I fear, are not as thorough as we should be and some of our examinations are too superficial. Are we doing our utmost to earn the higher fees that the public is fast becoming reconciled to and that we justly deserve if we give them conscientious service, or are our examinations still the type employed five or ten years ago when muscular anomalies were not thought seriously about; when Dynamic Skiametry was in its infancy and not the true and tried method of refraction that it is today; and when the trial case was the king to which the rank and file of refractionists paid homage?

Today we have a wonderful opportunity to serve well and efficiently with our new and improved Phor-optometers, our accurate Ophthalmometers, and our convenient, self-luminous retinoscopes, etc. The makers of opthalmic equipment have outdone them-

selves to provide us with these splendid instruments with which we might do our work more accurately and yet many do not purchase or even take the trouble to learn to operate even the least expensive or simplest of them.

Whether Optometry is to become a respected and highly ethical profession is now up to us as it never has been before. The public is already responsive. We need have no fear that the future of Optometry is not assured, if we will only do our part. The matter of our title not being used, as much as we could wish need give us no concern, as the public's recognition, not so much of our title as of our function and place in the conservation of human vision is very satisfying. But to put it briefly, we must, in the vernacular of the day, "deliver the goods." We are rapidly becoming a separate and distinct profession. We must therefore be professional and use professional methods. Our progress is satisfying, but we must move ever forward.

Now comes Dr. Houghton's call to rally round the standard of "co-operative education." His plan for state societies to foster an educational movement among optometrists, to broaden them and render them even more efficient is very opportune. SHALL WE RESPOND? What we need today is a more serious effort on the part of every refractionist to improve himself and render a higher service to his patients. To further this end. Dr. Houghton has suggested that state organizations have more clinics in the use of instruments at their gatherings and encourage individual study courses. The idea is splendid. If every optometrist will make it his aim to keep abreast of the times and rapidly assimilate new ideas in optometric procedure and methods, Optometry's future will certainly be assured. May the day soon dawn when every practicing optometrist will be a professional man in the truest sense of the term, placing "service above self" and taking the utmost pride in building up and conserving the marvelous powers of the organs of vision.

L. J. A.

QUALITY AS A STANDARD OF VALUE.

From time to time as has always been the case, newspapers publish advertising stressing the price appeal in the matter of optical service. One cut follows another, prices seem to be "tumbling," and the optometrist with his ethical practice, who is getting his just fees, sometimes wonders how such a procedure will effect his practice.

In one of the larger centers of Minnesota a price cutter operates. He has the usual store. Large windows. Many signs and cards all pointing to the reduced and obviously absurd values (?) he has to offer, which he of course uses as a bait to lure the patients to him.

A block up the street from this establishment there is a practitioner to whom optometry owes much. His office has every modern device for the proper examination of eyes and he himself is equipped with the knowledge to use these instruments to the greatest advantage.

This optometrist charges a reasonable and just examination fee. His charges for the material used are also just and equitable. Only the highest quality of material procurable is prescribed by him and his patients are eager, whenever possible to recommend him to their friends.

Last week I sat for several hours in his private office adjoining his refracting room, and despite these repeated "cut price" advertisements which had been running in his town for some time, not one patient as much as questioned the fairness of his fees. I queried the optometrist about this later. He declared, "I built up my practice solely on the basis of quality. I recognize however that many patients have no appreciation of quality. To them glasses are glasses. They believe that every product coming under the same commodity classification is of identical quality. I disregard their complaints, stick to my standards and direct my personal appeal to those persons who do want the best quality and who are willing to pay for it. The size of my practice shows that there are plenty of these. The mistake that many optometrists make is in letting the price-buyers stampede them into lowering the quality of their material or work so as to meet the price competition."

Sticking to his quality, despite any opposition is the first thing an optometrist must do.

CURRENT LITERATURE

These are the titles of papers bearing on optometry. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the Authors name in **heavy face type.** The abbreviations mean: (Ill.), illustrated; (Pl.), plates; (Abst.), indicates that it is an abstract of the original article; and (Dis.), that discussion is published with paper.

GENERAL REFRACTION

Colberg, R. G. Hyperopia as the Indirect Cause of Squint. N. W. Jour. of Optom. Vol. 1, No. 2, p. 29.

Dean, E. J. A Critique on the Prescribing of Tinted Lenses. N. W. Jour. of Optom. Vol. 1, No. 2, pp. 22-28.

Deyo, B. V. Monocular and Binocular Judgment of Distance. (Abst.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 115-119.

Hall, C. M. The "Ideal" Ophthalmic Record Card. (Ill.) Opt. Age. Vol. 20, No. 10, pp. 58-60.

Jackson, E. The Pupil and Visual Acuity. (Abst.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 109-111.

Ridgway, G. C. A Talk on Chromatics. Opt. Jour. and Rev. Vol. LIII, No. 6, pp. 31-32.

Rogers, G. A. Vision Exercises for Children. The Optom. Wky. Vol. 14, No. 50, pp. 2522-2523.

Sharrett, G. O. The Desirability of a Fileable Record. (Ill.) E. E. N. & T. Mo. Vol. 3, No. 1, pp. 23-28.

Swaine, W. Comments on Myopia. Opt. Jour. and Rev. Vol. LIII, No. 3, pp. 32-34.

Whitten, J. E. Technic of Retinoscopy. Opt. Jour. and Rev. Vol. LIII, No. 3, pp. 31-32.

Wood, H. Eye Examinations in Neurotics and Psychoneurotics. (Abst.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 112-114.

OPTOMETRY

Objectionable Trade Association Practices Are Defined. (Special Report) N. W. Jour. of Optom. Vol. 1, No. 2, p. 34.

The Optometrists and the Elevation of Standards. (Editorial from Minnesota Medicine) (Abst.) The Optom. Wky. Vol. 14, No. 48, pp. 2431-2432.

OCULAR NEUROLOGY

McFadden, F. Intermittent Visual Perception, or Suspenopsia. (Ill.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 70-95.

OCULAR PATHOLOGY

Baxter, J. O. Glaucoma. Opt. Age. Vol. E. E. N. & T. Mo. Vol. 3, No. 1, p. 52.

Blegvad, O. Xerophthalmia, Keratomal- 20, No. 10, p. 55.

Brown, A. L. Hereditary Cataract. (Abst.) acia and Xerosis Conjunctivae. (Ill.) Amer. Jour. of Oph. Series 3, Vol. 7, No. 2, pp. 89-117.

COLOR VISION

Venable, W. M. Color and Luminosity. (Ill.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 22-39.

PHYSIOLOGIC OPTICS

Ives, H. E. A Theory of Intermittent Vision. (Abst.) Amer. Jour. of Phy. Optics (Ill.). Vol. 5, No. 1, pp. 120-124.

McFadden, F. Expressing Visual Acuity Understandingly. (Ill.) Opt. Age. Vol. 20, No. 10, pp. 31-36.

Zoethout, W. D. The Duplicity Theory. The Optom. Wky. Vol. 14, No. 48, pp. 2433-2434.

INDUSTRIAL EYE WORK

Alexander, F. J., and Von Harten, A. E. Twenty-Three Years in School Eye Work. (Ill.) Opt. Age. Vol. 20, No. 10, pp. 39-40.

Davis, A. W. Visual Standards for Auto Drivers. (Ill.) Opt. Age. Vol. 20, No. 10, pp. 19-23.

Sempson, R. E. Defective Vision and Industrial Accidents. Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 48-56.

OCULAR MUSCLES

Banister, J. M. Practical Considerations in Connection with the Study of Dynamics of the Ocular Muscles. (Ill.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 3-21.

Koch, C. C. Unusual Posture Developes Abnormal Power in the Inferior Rectus Muscle. (Ill.) N. W. Jour. of Optom. Vol. 1, No. 2, pp. 29-30.

Payne, S. M. Actions of Eye Muscles Under All Conditions. (Ill) E. E. N. & T. Mo. Vol. 3, No. 1, pp. 13-22.

White, J. E. Physiological Component of Ciliary Cramp. Opt. Jour. and Rev. Vol. LIII, No. 6, pp. 27-31.

Wolff, J. A new Method for the Study and Determination of the Accommodative Convergence Requirements. (Ill.) Amer. Jour. of Phy. Optics. Vol. 5, No. 1, pp. 96-108.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE MINNESOTA CONVENTION

The Twenty-Fourth Annual Convention of the Minnesota State Association of Optometrists was a splendid success. The convention was well attended, and well planned, the St. Paul men having things well in hand. Many of the newer phases of optometric diagnostic procedure were discussed, by the four lecturers, Drs. Petry, Dean, Koch and Best, and the discussions following the talks indicated the lively interest shown by the optometrists present.

The officers elected to serve the society for the year 1924 were as follows: Dr. J. L. Kubicek, Waseca, president; Dr. C. G. Mack, Little Falls, first vice-president; Dr. R. S. Dean, Duluth, second vice-president; Dr. H. B. Kollofski, St. Paul, third vice-president; Dr. A. C. Hoffman, Minneapolis, fourth vice-president; Dr. J. I. Kurtz, Minneapolis, secretary, and Dr. F. Zimmerman, Minneapolis, treasurer.

The retiring president, Dr. A. H. Nordland, spoke at some length on the accomplishments of the past year, as did the secretary, both pledging their fullest support to the new administration.

It was decided to hold a mid-summer clinic and convention in one of the smaller cities in the southern part of the state, and a commission was appointed to draft an outline of the business activities of the **Northwest Journal of Optometry.** Dr. Roy S. Dean will head this commission. Dr. Ernest Kiekenapp, national secretary, spoke regarding the optometry law violations and he and our secretary reviewed several prosecutions.

The convention ended with a banquet. Speeches, entertainment and finally dancing were highly enjoyed by the several hundred persons present as well as the **"Optometrists Extra,"** which the St. Paul society assisted by The St. Paul **Dispatch** distributed to the assemblage.

CORRESPONDENCE

January 30, 1924.

Dr. Jack I. Kurtz,
Bus. Mgr., N. W. Journal of Opty.,
Minneapolis, Minn.

Dear Doctor,

The first issue of the Northwest Journal of Optometry came to my desk a welcome visitor. In fact I feel that the only objection is that this little paper is several years past due, as I have for some years entertained the idea that such a paper had become a necessity and its establishment, though accompanied with some risk perhaps, an effort well worth while.

That every Optometrist in the northwest will get behind this little publication with his subscription fee and his support, however desirable and however much we may feel it his duty and to his interest, is more than any of us who have had any experience in organization work can reasonably expect. But it would not seem an extravagant expectation to hope that at least a majority will do so. And when we look over the list of names of those who constitute the editorial staff and collaborators, all of them our neighbor Optometrists many of whom we know and esteem, we cannot help but feel that we have something very good coming that will be of local and personal interest to every Optometrist in Minnesota and the Dakotas.

Certainly no Optometrist in the northwest can afford to be without the inspiration this little visitor will bring regularly to his work.

I enclose the necessary $3 for subscription.

Fraternally yours,
(Signed) GEO. E. SPOFFORD,
Opt. D.

(Editorial Note: Dr. Spofford's letter and check were gratefully received. In so much as all members of our respective state organizations receive the Northwest Journal of Optometry as part of the benefits derived from their membership, his check was of course returned. It is our wish that this magazine will be mutually helpful to the optometric practitioners of this district, and it can be made exceedingly so, if the optometrists in these three states co-operate by sending in special case reports and other data that will add to the sum of optometric and refractive knowledge.)